

# NGX™

## GRAND



## Installation & Owner's Manual Supplement



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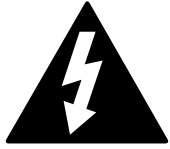
# Safety



## IMPORTANT SAFETY INFORMATION



1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. The mains plug shall be readily operable.
16. When replacing a battery – **CAUTION:** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.
17. **IMPORTANT:** This jukebox is designed to be secured to a wall for safety and stability. In order to prevent tipping, use the provided hardware to attach the jukebox to the wall. See page 1-8 for instructions.

**CAUTION!**

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of non-insulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

**CAUTION!**

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance or servicing instructions.

**WARNING!**

To Reduce The Risk Of Fire Or Electric Shock, Do Not Expose This Jukebox To Rain Or Moisture.

No objects filled with liquid, such as vases, shall be placed on the jukebox.

**WARNING!**

An apparatus with class I construction shall be connected to a mains socket outlet with protective earthing connections.

**CAUTION!**

**RISK OF ELECTRIC SHOCK  
DO NOT OPEN**

**DO NOT REMOVE ANY COVERS, GUARDS, OR SHIELDS.  
NO USER SERVICABLE PARTS INSIDE.  
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.**

# Section: 1 Unpacking & System Description

## Introduction

The NGX Grand jukebox is part of a much larger system – the AMI Entertainment network. This network is a digital platform that delivers music across the Internet to Rowe Jukeboxes anywhere.

The NGX Grand jukebox is an Internet-enabled jukebox that allows all the traditional functions of a jukebox backed by the power of the Internet. This Internet connectivity gives patrons more features, such as the ability to download “Music On Demand” songs when their song choice is not already on the jukebox.

The NGX Grand is actually a cabinet that houses a slightly modified standard NGX wall mount jukebox. The standard NGX has been modified to allow the locking mechanisms to be accessed by keyed locks in the NGX Grand cabinet.

Refer to the NGX Installation and Owner’s Manual 22022617 (included with the NGX Grand) for information regarding system operation, setup and maintenance. Since the NGX is already mounted in the NGX Grand cabinet, you can ignore the section in that manual on how to mount the NGX on a wall.

## **NGX Grand Jukebox Features**

- Sturdy construction and reliable design
- Conveniently located customer, operator, and service controls
- All major components are modular and easy to replace, if needed
- Computer-controlled digital music
- A 500-watt ICEpower Class 2 power amplifier manufactured by Bang & Olufsen.
- Audio output transformer with 70-volt taps
- Deluxe 4-channel preamplifier
- Song reject
- 300 album and cover art capacity
- Unwanted music categories, artists, albums, and songs can be blocked
- Quarter coin acceptance
- Bill acceptance of \$1, \$5, \$10, and \$20
- 700 bill capacity
- Web-based management
- Attract mode
- “Music On Demand” song download
- Dynamic search capabilities
- No pause between plays
- Easy to change pricing

### **Service Features:**

- Modular component construction for easy replacement
- No CDs to bother with or cumbersome cover art mechanisms
- Complete cash and play audit information
- Password protected Operator Web Site
- Access anytime and from anywhere
- Track revenue and usage
- Download new music and other content
- Check system status



## Unpacking Instructions

This section contains information for unpacking the jukebox and installing it at a location. The jukebox is shipped with all major components.

1. Remove the shipping carton with care: Do not use shipping hooks or sharp tools that could damage the jukebox cabinet.
2. Remove the plastic bag that covers the jukebox.
3. Carefully inspect the interior and exterior of the jukebox to ensure that no damage occurred during transit.



### CAUTION!

Do not open the NGX front door until the speakers have been moved from their shipping position (see next page). Failure to reposition the speakers can result in damage to the speakers or the lighting assembly.

If damage is detected, the carrier who delivered the jukebox should be contacted immediately to examine it. Regardless of the exterior condition of the shipping cartons, the carrier should be called and notified of damage. Do not destroy packing material or boxes until the carrier's agent has examined them.

Damage claims are your responsibility. Do not return damaged merchandise until after your claim has been established. Once your claim has been established, merchandise may be returned to your Rowe distributor for repair. The invoice amount for repair charges can then be collected from the carrier.

## Keys

Locate the white bag taped to the power inlet on the back of the cabinet. Remove the door keys from the bag and unlock the rear door assembly. Turn the key to the right and press in on the door as you turn the key.

## Visual Inspection

Check to be sure that all electrical plugs are completely seated into their receptacles.

## Warranty Registration Card

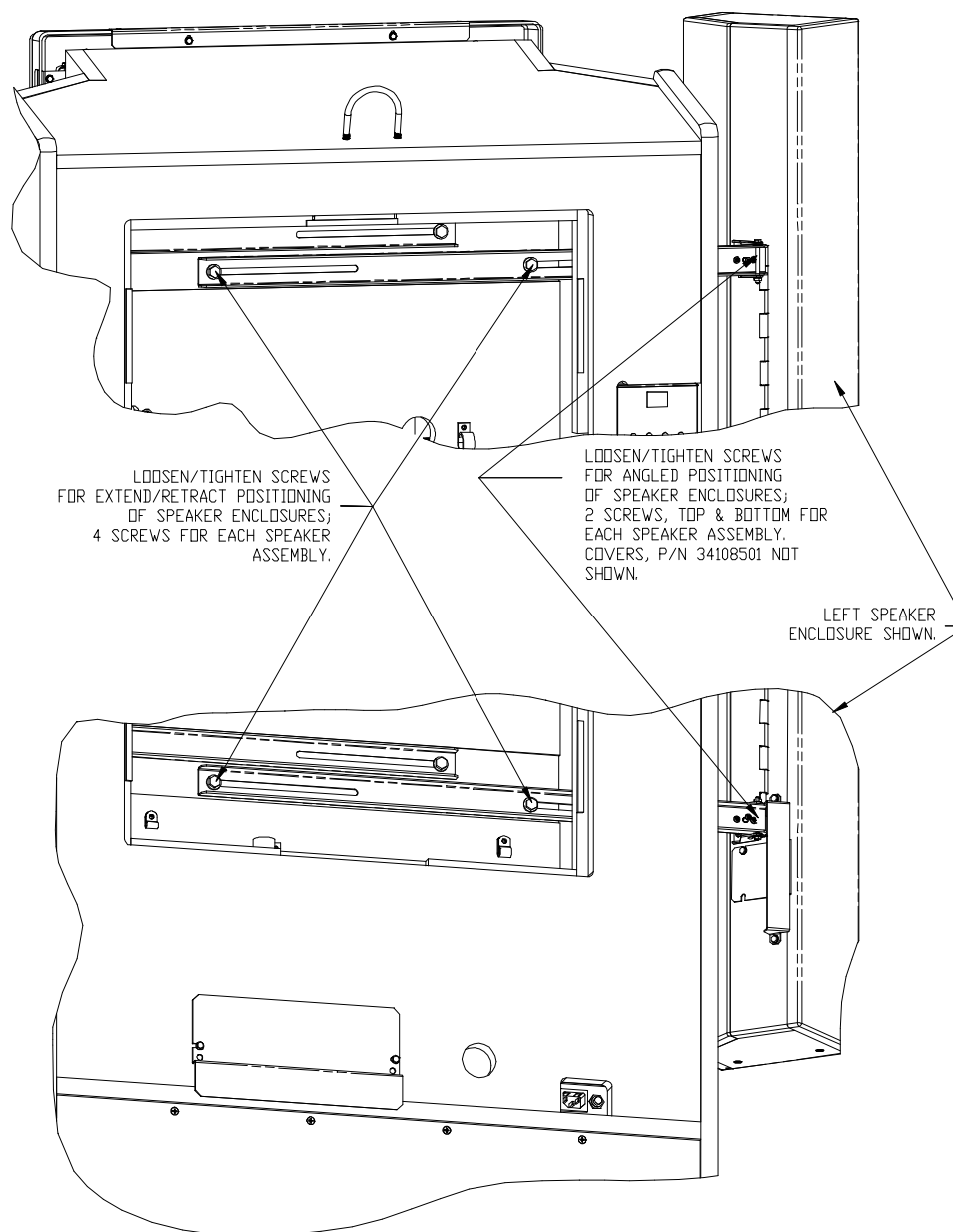
A Warranty Registration Card is included in the NGX manual. This card should be filled out and returned to Rowe.

## Speaker Setup

The NGX Grand is packed with the speakers in the shipping position. In this position, the front door of the NGX will not open all the way.

Open the back door of the NGX Grand cabinet and loosen the bolts holding the left-hand speaker mounting rails to the cabinet. Slide the left-hand speaker out so the lighting assembly will clear the left-hand speaker when the door is opened.

Both speakers can be extended and rotated to any position that suits your location. Be sure to secure the speakers in their final position by tightening the bolts and screws.



**Figure 1-A Speaker Positioning**

## Major Components of the NGX Grand

### Computer Core

The Computer Core Assembly is the heart of the system and has a hard drive and a single board computer. The hard drive is the only storage in the system and contains Windows XP Embedded Operating System software, all application software, all music, and all setup and audit data. The single board computer converts music selections stored on the hard drive into a stereo signal for the system's audio components. It connects to the Internet, the SVGA touchscreen monitor, and the Rowelink modules. It also includes the interface circuits for the coin switch, router reset, fan circuits, bill acceptor, song reject, infrared remote control detector and amplifier mute.

### Touchscreen 32" Vertical LCD Flatscreen 1920 x 1080 resolution

All machine operations are performed through the touchscreen monitor. These include viewing and making selections, displaying the selection being played, displaying pricing and credits, viewing and changing setup and audit data, and downloading "Music On Demand" selections.

### Power Distribution Assembly

The power distribution assembly contains a relay to switch the jukebox lights, touchscreen monitor, and the bill acceptor ON or OFF. It has an IEC 320 power inlet, and one 15A circuit breaker ON/OFF switch.

### Volume Control Unit

The Volume Control Unit (VCU) mounted on the back of the NGX Grand cabinet is a Rowelink module and can be mounted remotely (behind bar, etc.). A plate is supplied in the Handy Pack to cover the hole if the VCU is removed. Use the VCU screws to secure the plate. The VCU displays and controls the volume of the amplifier channels and microphones.

- The POWER button turns the NGX Grand jukebox lights, touchscreen monitor, and bill acceptor ON or OFF.
- The REJECT button rejects the selection playing.
- The FUTURE button adds credits toward selections (see "Credit Management" in the Operator Setup Screens Manual).
- The MODE key toggles between channels and microphones.
- The VCU also raises or lowers the volume of the channel(s) or microphone using the UP/DOWN keys. The volume range is 0 to 63. Channel volume is displayed when the mode LED is off, and microphone volume is displayed when the mode LED is on. The CH, MIC, and SINGER LEDs indicate what volume is being displayed when toggled by the Mode Switch. When adjusting channel volume, if more than one LED is on, it means those channels have the same volume. All four channels have the same volume when shipped from the factory (see *Section 3* of the included "Network Setup, Jukebox Operation, Operator Setup Screens" manual for other possible configurations).

### Bill Acceptor

The Coinco<sup>®</sup> Vantage<sup>™</sup> with a 700-bill stacker, or MEI<sup>®</sup> Series 2000 bill acceptor with a 700-bill stacker, operates on 120 VAC input power and sends its pulsed credit signals to the Computer Core.

## Lighting Assembly

The NGX Grand comes with a custom lighting assembly already installed on the jukebox. The LED controller for the lighting assembly is configured to rotate through all available colors and can be programmed for several different modes of operation. To change modes, see page 2-2 for specific instructions.

## Deluxe 4-Channel Preamplifier

This Rowelink module transforms audio signals from the Computer Core Assembly, microphones, and other sound processors/equipment/systems into signals for the Power Amplifier. It contains Automatic Volume Control (AVC) circuits to adjust for varying recording levels, input gain control, 5-band equalizers, and a loudness contour. All adjustments and options are programmable via the touchscreen and are retained on the Computer Core Assembly hard drive (see *Section 3* of the included “*Network Setup, Jukebox Operation, Operator Setup Screens*” manual for setup information).

## 500-Watt Audio Digital Power Amplifier

The 2-channel digital audio power amplifier is rated 500 watts RMS (250 per channel) into a 4-ohm load. The full volume output voltage is 31 volts.

The amplifier is protected against overloads and short circuits. Continuous severe overloads or shorts may shut down the amplifier (or a channel) but will not damage it. If the overload is removed, a signal will reset the amplifier when the next selection plays.

## Audio Output Transformers

The Audio Output Transformer Assembly is located in the back of the NGX Grand jukebox cabinet. It is designed to enable the jukebox to connect to a wider variety of speakers and speaker configurations, including 70-volts speakers.

The output transformers are used to “step up” the power amplifier’s output voltage for 70-volt extension speakers. They also provide screw terminal connections for selecting different power levels for standard extension speakers.

As shipped from the factory, the NGX Grand jukebox speakers are connected to the E7 taps on the transformers. In this configuration, the jukebox speaker system will use about 250 watts of the rated 500-watt amplifier. The other 250 watts are available for extension speakers.

## NGX Grand Specifications

### General

Depth.....	22-1/2 in.
Width .....	37 to 45 in.
Height .....	79-1/2 in.
Power Requirements .....	120 VAC 60 Hz. 500 watts 5.25 amps

**Pricing** ..... See "Credit Pricing" in  
the "Network Setup and Jukebox Operation Manual" (P/N21822707)

### Sound System

Core Computer Type .....	16-bit Stereo
Frequency Response.....	20 to 20,000 Hz.
Channel Separation .....	90 dB @ 1,000 Hz.
Output.....	0.7 VRMS (approx. depending on the album)

### Preamplifier

Deluxe 4-Channel (Two Stereo, Four Mono, many other combinations)  
Tone Control – 5-band equalizer (+2.5db to -12db Filter/Band)

### Power Amplifier

500-Watt Stereo (Second 500-watt Stereo Amplifier is Optional)  
FTC Rating, 4-ohm Loads @ 1% THD..... 500 watts RMS  
FTC Rating, 70V Lines @ 1% THD (125 per channel) ..... 250 watts RMS

### Transformer Package

70V line for extension speakers  
System Frequency Response .....40 to 20,000 ±4 dB

### Speakers

15" Dual Voice Coil Woofer, 5" Mid-Bass, 3" Tweeter

**Selection System Capacity** .....300 Albums

### Circuit Breakers

System Power Supply  
120 VAC ..... Combination 15 Amp Breaker and Power Switch

### Lighting

**LED** ..... Custom

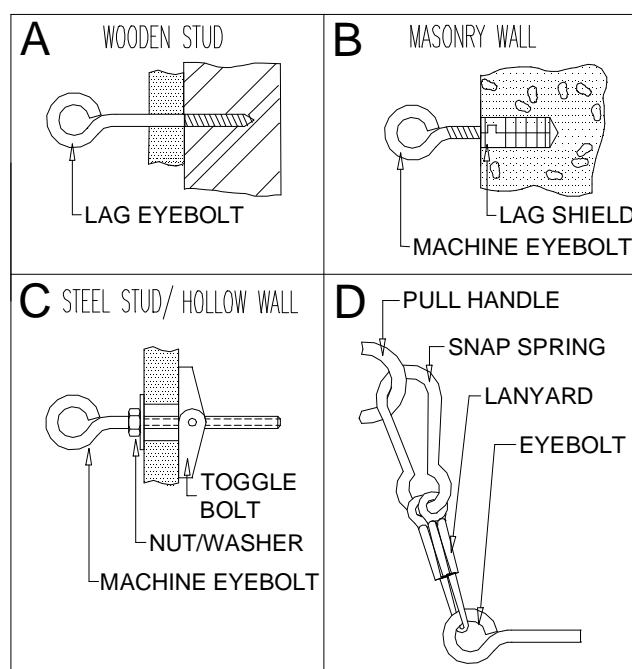
## Anti-Tip Installation Instructions

It is **VERY IMPORTANT** that the jukebox is secured to a wall for safety and stability. Locate the supplied hardware inside the handy pack and follow the instructions below to secure the jukebox to a wall.

CONTENTS:

QTY	PART #	DESCRIPTION
1	HW0128-01	SNAP SPRING
1	HW0081-04	LANYARD
1	HW1340-03	#1/4-20x4.00L EYEBOLT
1	HW1380	#1/4-20 WINGNUT
1	HW3300	1/4-20 HEX NUT
1	HW1360	LAG EYEBOLT
1	HW5554-03	.05Tx.28IDx1.5 WASHER
1	HW1370-02	1/4-20x1 WALL ANCHOR

1. Turn off and unplug the jukebox.
2. Locate a wall stud to mount the jukebox.
3. Measure approximately 76" from the floor on the mounting stud and drill a hole to install the hardware. Installation into a wooden stud requires a 2" deep x 1/4" hole. For masonry walls, drill a 1 1/4" deep x 1/2" hole. For steel stud or hollow walls drill an 11/16" hole.
4. For wooden stud installation, screw the lag eyebolt into the hole (see Figure A). For masonry wall, insert the lag shield into the hole and then insert and tighten the machine eyebolt (see Figure B). For steel stud or hollow walls, insert the toggle bolt into the hole and then insert the machine eyebolt, nut and washer and tighten (see Figure C).
5. Route the lanyard through the eye bolt and attach it to the snap spring as shown in Figure D. Then, attach the snap spring to the U-bolt on the top of the jukebox.



## Section: 2 Power Up and Initial Testing



### CAUTION

Hard drives are extremely sensitive to physical mishandling. Always keep the hard drives protected from accidental falls, banging, dust, or liquids. To avoid damage, do not remove drive from tray.



### WARNING

Never install or remove a hard drive when the unit is powered on. As an extra precaution, always unplug the CC (Core Computer) from the power source before removing or installing a hard drive.

Your NGX Grand is shipped from the factory with a hard drive already installed in the computer core.

1. The power cord is shipped in the spare parts bag. Locate the power cord and insert one end of the cord into the IEC connector located on the back of the jukebox. Insert the other end into a grounded 120-volt 15-amp wall socket.



### CAUTION

Do not open the NGX front door until the speakers have been moved from their shipping position. Failure to reposition the speakers can result in damage to the speakers or the lighting assembly.

2. After moving the speakers from their shipping position, open the front door of the NGX using the upper key lock on the right side of the jukebox. Turn on the red POWER switch located on the left inside of the NGX. There will be a slight delay before the lights and fans turn on.
3. Allow the jukebox to boot up completely. Refer to the “NGX Installation and Service Manual” for further information on testing touchscreen calibration, currency devices, etc.
4. Add credits to the jukebox and make a selection. You should hear the selection play through the jukebox speaker system. Verify that all speakers are working properly.
5. Finally, adjust the speakers for the best sound coverage in your location.

## Lighting Assembly Modes

The NGX Grand lighting assembly can be programmed for several different modes of operation. By default, the lighting assembly is set to slowly cycle through six different colors with a slow transition between each color.

To change the mode, open the main door of the jukebox. The lighting assembly will swing open with the door. Use a Philips screwdriver and remove the LED controller cover from the back side of the lighting assembly. This exposes the LED controller.

There are two blue pots on the board marked BRIGHT and SPEED. These are used to set the brightness of the LEDs and adjust the speed of color changes for the two color cycling modes.

The four position DIP switch is used to set the operating mode of the controller. Use the following table to set the mode.

SW1	SW2	SW3	SW4	Mode
OFF	OFF	OFF	OFF	Cycle – slow transition through colors (default)
OFF	ON	OFF	OFF	Blue
OFF	OFF	ON	OFF	Cyan
OFF	ON	ON	OFF	Green
OFF	OFF	OFF	ON	Cycle – quick transition through colors
OFF	ON	OFF	ON	Yellow
OFF	OFF	ON	ON	Magenta
OFF	ON	ON	ON	Red
ON	OFF	OFF	OFF	White



## Section: 3 Extension Speakers

### Extension Speaker Operation

To avoid poor sound quality, care must be taken when adding extension speakers. The following requirements must be met:

Speakers connected to the Output Transformer Assembly must be wired so the power consumed by the extension speakers does not exceed the amplifier power rating of 250 watts per channel.

An Output Transformer Assembly has:

- Two transformers (one for each channel).
- Two 7-position terminal strips for low impedance speakers marked E1 through E7.
- One 4-position terminal strip for 70-volt speakers marked Ch1 A1-A2, Ch 2 A1-A2.
- Speakers connected across terminals E1 to E7 bypass the transformer and are driven directly by an amplifier channel.
- Each transformer provides 70V terminals for driving 70V speakers, and provides taps (E1-E6) for driving extension speakers at a lower volume. The power consumed by speakers driven by a transformer must not exceed the transformer rating of 125 watts per channel.
- The power consumed by all connected speakers must not exceed the channel rating of 250 watts. For example, each channel could drive 125 watts directly from the amplifier (E1 to E7), and the remaining 125 watts through the transformer (lower taps and 70V terminals).
- Complete the Extension Speaker Worksheet (*Tables 1-1 through 1-5*) for each channel and verify it does not exceed the 125-watt transformer rating and the 250-watt amplifier channel rating. After wiring the speakers, perform the Amplifier Overload Check immediately following *Table 1-5*.

All speakers must be connected with the correct polarity (see *Figure 3-A through 3-F*).

Channel 1 E1-E7 output is in phase with channel 2 E1-E7 output. The speaker connections for channel 1 speakers are in phase with channel 2 speakers. The 70V phasing is reversed inside the output transformers. See *Figure 3-D* for correct polarity hookup of extension speakers. If the (+) and (-) terminals are not wired properly, the speakers will be out of phase, causing a reduction in low frequencies (bass).

### 70-Volt Speakers

To avoid prohibitive cable losses on long speaker lines (over 100 feet), use 70V speakers. The power level in the 70V speakers is set at each speaker. For each channel, a maximum of 125 watts are available for 70V speakers by terminal connections on the audio output transformer assembly.

### Low Impedance Speakers

Low impedance speakers (16, 8, or 4-ohm) can be used when the connecting cable is less than 100 feet. Keep the following two things in mind when wiring your speakers:

1. No more than one 4-ohm speaker should be connected to a speaker line. If several 4-ohm speakers are to be used, each speaker should have its own line.
2. The loss in 100 feet of 18-gauge zip-cord feeding on an 8-ohm speaker is 15%. The loss for two 8-ohm speakers is 30%.

## Selecting Speaker Power

### General Instructions

This section will lead you through the power and speaker selection process. This process consists of three major steps and several smaller steps. The major steps are:

1. Identify the extension speakers and compute the speaker power for speakers connected:
  - a. directly across the amplifier (E1 to E7)
  - b. to the 70V taps
  - c. to lower power taps on the transformer (E1 through E6).
2. Make the extension speaker connections.
3. Perform an amplifier overload check (see instructions immediately following *Table 1-5*).

### Selection Procedures

- Use a pencil (you may want to revise your figures) to fill in the Extension Speaker Worksheet on the following pages.
- Extension speakers are available in two general categories: general purpose speakers (16, 8, and 4-ohm), and 70V speakers. The power level in 70V speakers is set at each speaker.
- Use the *Table 1-1* through *1-5* Worksheets to help you calculate the amount of power consumed by the extension speakers.
- An extension speaker RMS power rating should be at least 10% higher than the power it will consume at maximum jukebox volume.

When RMS power to speaker  
at maximum jukebox volume is:

240 watts  
120 watts  
60 watts  
30 watts

Then recommended RMS power  
rating of speaker is:

300 watts  
150 watts  
75 watts  
40 watts

---

**Table 1-1 – Extension Speaker Worksheet**  
**Sheet 1**

---

**Extension Speakers Connected E1 to E7**

Place the quantity of speakers in the blank under **Qty** and multiply the quantity times the power consumption. Place your results in the blank under **Total**.

	<b>Qty</b>			<b>Total</b>	
	<b>CH 1</b>	<b>CH 2</b>		<b>CH 1</b>	<b>CH 2</b>
Two 8-ohm speakers in series: (30 watts to each speaker)	_____	_____	at 60 watts per series =	_____	_____ watts
Two 4-ohm speakers in series: (60 watts to each speaker)	_____	_____	at 120 watts per series =	_____	_____ watts
16-ohm speakers:	_____	_____	at 60 watts each =	_____	_____ watts
8-ohm speakers:	_____	_____	at 120 watts each =	_____	_____ watts
4-ohm speakers:	_____	_____	at 240 watts each =	_____	_____ watts
Sum totals for CH1 and CH2 then transfer totals to Table 1-5.				_____	_____ watts

---

(Continued on the next page.)

---

**Table 1-2 – Extension Speaker Worksheet**  
**Sheet 2**

**4-Ohm Speakers Connected To Transformer Taps E1 through E6**

Place the quantity of speakers in the blank under **Qty** and multiply the quantity times the power consumption. Place your results in the blank under **Total**.

**4-Ohm Speakers Connected to Channel 1 Transformer Taps:**

	<b>Connections</b>	<b>Qty</b>		<b>Total</b>
Speakers for the 1-watt taps:	(E1 to E2)	_____	at 1 watt each =	_____ watts
Speakers for the 4-watt taps:	(E1 to E3)	_____	at 4 watts each =	_____ watts
Speakers for the 16-watt taps:	(E1 to E4)	_____	at 16 watts each =	_____ watts
Speakers for the 36-watt taps:	(E3 to E5)	_____	at 36 watts each =	_____ watts
Speakers for the 49-watt taps:	(E2 to E5)	_____	at 49 watts each =	_____ watts
Speakers for the 64-watt taps:	(E1 to E5)	_____	at 64 watts each =	_____ watts
Speakers for the 100-watt taps:	(E3 to E6)	_____	at 100 watts each =	_____ watts
Speakers for the 121-watt taps:	(E2 to E6)	_____	at 121 watts each =	_____ watts

Sum totals for CH1 then transfer total to Table 1-5. \_\_\_\_\_ watts

**4-Ohm Speakers Connected to Channel 2 Transformer Taps:**

	<b>Connections</b>	<b>Qty</b>		<b>Total</b>
Speakers for the 1-watt taps:	(E1 to E2)	_____	at 1 watt each =	_____ watts
Speakers for the 4-watt taps:	(E1 to E3)	_____	at 4 watts each =	_____ watts
Speakers for the 16-watt taps:	(E1 to E4)	_____	at 16 watts each =	_____ watts
Speakers for the 36-watt taps:	(E3 to E5)	_____	at 36 watts each =	_____ watts
Speakers for the 49-watt taps:	(E2 to E5)	_____	at 49 watts each =	_____ watts
Speakers for the 64-watt taps:	(E1 to E5)	_____	at 64 watts each =	_____ watts
Speakers for the 100-watt taps:	(E3 to E6)	_____	at 100 watts each =	_____ watts
Speakers for the 121-watt taps:	(E2 to E6)	_____	at 121 watts each =	_____ watts

Sum totals for CH2 then transfer total to Table 1-5. \_\_\_\_\_ watts

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(Continued on the next page.)

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**Table 1-3 – Extension Speaker Worksheet  
Sheet 3**

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**8-Ohm Speakers Connected To Transformer Taps E1 through E6**

Place the quantity of speakers in the blank under **Qty** and multiply the quantity times the power consumption. Place your results in the blank under **Total**.

**8-Ohm Speakers Connected to Channel 1 Transformer Taps**

	<b>Connections</b>	<b>Qty</b>	<b>Total</b>
Speakers for the .5-watt taps:	(E1 to E2)	_____ at .5 watt each	= _____ watts
Speakers for the 2-watt taps:	(E1 to E3)	_____ at 2 watts each	= _____ watts
Speakers for the 8-watt taps:	(E1 to E4)	_____ at 8 watts each	= _____ watts
Speakers for the 18-watt taps:	(E3 to E5)	_____ at 18 watts each	= _____ watts
Speakers for the 24-watt taps:	(E2 to E5)	_____ at 24 watts each	= _____ watts
Speakers for the 32-watt taps:	(E1 to E5)	_____ at 32 watts each	= _____ watts
Speakers for the 50-watt taps:	(E3 to E6)	_____ at 50 watts each	= _____ watts
Speakers for the 72-watt taps:	(E1 to E6)	_____ at 72 watts each	= _____ watts
Speakers for the 95-watt taps:	(E3 to E7)	_____ at 95 watts each	= _____ watts

Sum totals for CH1 then transfer total to Table 1-5. \_\_\_\_\_ watts

**8-Ohm Speakers Connected to Channel 2 Transformer Taps**

	<b>Connections</b>	<b>Qty</b>	<b>Total</b>
Speakers for the .5-watt taps:	(E1 to E2)	_____ at .5 watt each	= _____ watts
Speakers for the 2-watt taps:	(E1 to E3)	_____ at 2 watts each	= _____ watts
Speakers for the 8-watt taps:	(E1 to E4)	_____ at 8 watts each	= _____ watts
Speakers for the 18-watt taps:	(E3 to E5)	_____ at 18 watts each	= _____ watts
Speakers for the 24-watt taps:	(E2 to E5)	_____ at 24 watts each	= _____ watts
Speakers for the 32-watt taps:	(E1 to E5)	_____ at 32 watts each	= _____ watts
Speakers for the 50-watt taps:	(E3 to E6)	_____ at 50 watts each	= _____ watts
Speakers for the 72-watt taps:	(E1 to E6)	_____ at 72 watts each	= _____ watts
Speakers for the 95-watt taps:	(E3 to E7)	_____ at 95 watts each	= _____ watts

Sum totals for CH2 then transfer total to Table 1-5. \_\_\_\_\_ watts

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(Continued on the next page.)

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**Table 1-4 – Extension Speaker Worksheet**  
**Sheet 4**

**16-Ohm Speakers Connected To Transformer Taps E1 through E6**

Place the quantity of speakers in the blank under **Qty** and multiply the quantity times the power consumption. Place your results in the blank under **Total**.

**16-Ohm Speakers Connected to Channel 1 Transformer Taps**

	<b>Connections</b>	<b>Qty</b>		<b>Total</b>
Speakers for the .25-watt taps:	(E1 to E2)	_____	at .25 watt each =	_____ watts
Speakers for the 1-watt taps:	(E1 to E3)	_____	at 1 watts each =	_____ watts
Speakers for the 4-watt taps:	(E1 to E4)	_____	at 4 watts each =	_____ watts
Speakers for the 9-watt taps:	(E3 to E5)	_____	at 9 watts each =	_____ watts
Speakers for the 12-watt taps:	(E2 to E5)	_____	at 12 watts each =	_____ watts
Speakers for the 16-watt taps:	(E1 to E5)	_____	at 16 watts each =	_____ watts
Speakers for the 25-watt taps:	(E3 to E6)	_____	at 25 watts each =	_____ watts
Speakers for the 36-watt taps:	(E1 to E6)	_____	at 36 watts each =	_____ watts
Speakers for the 47-watt taps:	(E3 to E7)	_____	at 47 watts each =	_____ watts

Sum totals for CH1 then transfer total to Table 1-5. \_\_\_\_\_ watts

**16-Ohm Speakers Connected to Channel 2 Transformer Taps**

	<b>Connections</b>	<b>Qty</b>		<b>Total</b>
Speakers for the .25-watt taps:	(E1 to E2)	_____	at .25 watt each =	_____ watts
Speakers for the 1-watt taps:	(E1 to E3)	_____	at 1 watts each =	_____ watts
Speakers for the 4-watt taps:	(E1 to E4)	_____	at 4 watts each =	_____ watts
Speakers for the 9-watt taps:	(E3 to E5)	_____	at 9 watts each =	_____ watts
Speakers for the 12-watt taps:	(E2 to E5)	_____	at 12 watts each =	_____ watts
Speakers for the 16-watt taps:	(E1 to E5)	_____	at 16 watts each =	_____ watts
Speakers for the 25-watt taps:	(E3 to E6)	_____	at 25 watts each =	_____ watts
Speakers for the 36-watt taps:	(E1 to E6)	_____	at 36 watts each =	_____ watts
Speakers for the 47-watt taps:	(E3 to E7)	_____	at 47 watts each =	_____ watts

Sum totals for CH2 then transfer total to Table 1-5. \_\_\_\_\_ watts

---

(Continued on the next page.)

**Table 1-5 – Extension Speaker Worksheet  
Sheet 5**

**Combine power consumption of all speakers:**

	<b>Channel 1</b>	<b>Channel 2</b>	
Connected E1 to E7	_____	_____	
Tapped 4-Ohm	_____	_____	} Sum of tapped and 70-Volt A1, A2 must NOT exceed 125 watts per channel.
Tapped 8-Ohm	_____	_____	
Tapped 16-Ohm	_____	_____	
70-Volt A1, A2	_____	_____	
	<b>Channel 1</b>	<b>Channel 2</b>	<b>Grand Total</b>
Totals:	_____	+ _____	= _____

Subtract the Grand Total from 500 and  
write the results here:

**Power available for jukebox:** \_\_\_\_\_

The Grand Total is the amount of power that the jukebox will need to supply to the extension speakers. If the Channel 1 Total or the Channel 2 Total is more than 250 watts, you must reduce the power used by that channel's extension speakers, and then recalculate that channel's power consumed.

When you subtract the Grand Total from 500, you will get the "Power Available for the Jukebox". Be sure to write this value down in the blank above because you will not be using it until you have wired all of the extension speakers.

**NOTE:** In any speaker installation, the total RMS speaker load (the sum of all power to all speakers) must not exceed 250 watts per channel. It is strongly recommended that "efficient" extension speakers be used.

When you have reached a satisfactory combination of speakers and speaker power consumption, use the "Connections" column as a wiring guide to make the actual connections. Speaker terminal strips on the output transformer are accessed by removing the cover from the rear of the jukebox.

## Jukebox Speaker Power

Once you determine the total power needed for extension speakers, what is left over can be used by the jukebox speaker system. Use the table below to tap the jukebox speaker in order to “use up” the remaining amplifier power.

If there is no power left over after connecting extension speakers and you still want to use the jukebox speakers, you will have to reconfigure your extension speakers to leave some power left over for the jukebox.

Select the speaker taps for the jukebox speakers that will use up as much of the “Power available for jukebox” as possible.	
Jukebox Power	Jukebox Speaker Connections
.5	Violet to Channel 1 E2, Pink to Channel 2 E2
2	Violet to Channel 1 E3, Pink to Channel 2 E3
8	Violet to Channel 1 E4, Pink to Channel 2 E4
32	Violet to Channel 1 E5, Pink to Channel 2 E5
72	Violet to Channel 1 E6, Pink to Channel 2 E6
120	Violet to Channel 1 E7, Pink to Channel 2 E7
Do not reposition the black/white wires. They should stay on E1.	

## Amplifier Overload Check

Check that the amplifier is not overloaded by performing the following steps:

1. Make sure that the extension speakers are connected to the audio output transformer terminals properly (E1 through E7, and A1, A2).
2. Make a selection and set the volume control to maximum.
3. If the red OVERLOAD LED is always lit, the amplifier is overloaded and will shut down. You must perform Step 4.
4. Do this step only if the OVERLOAD LED came on as described in Step 3.
  - Find the source of the overload (shorted speaker wires, shorted speaker, too many speakers connected, speaker power taps too high).
  - After you fix the short, disconnect a few speakers or lower the speaker power tap selection to reduce the wattage. Repeat from Step 2.
  - If no overload is detected, reconnect the disconnected speakers (ensure you do not have too many speakers). Repeat from step 2.
5. If the red OVERLOAD LED does not turn on but the sound through the speakers sounds distorted, the sound system may be over driven. Reduce the input gain setting or equalizer settings using the jukebox Service Mode screens *Volume Presets* and *Equalizer Setup* under *Hardware Setup* until the sound heard from the speakers is clean and clear.



## Sample Speaker Connections

### Speaker Synopsis

#### 500 Watts of RMS Power per Amplifier or 250 Watts per Channel.

The generic speaker wiring diagrams cover 4 to 18 speakers.

The power rating indicated for each speaker is the actual power delivered to each speaker. We recommend using a higher-rated speaker to ensure adequate performance. This is to provide a safety factor and will also provide extended life for the speakers. However, using a speaker with a rating much higher than absolutely necessary will be more expensive and not cost effective.

Figure 3-B is a four speaker layout with the NGX speaker system disconnected. If you want this layout with only four speakers, then the speakers must be rated for 150 watts at 8 ohms. These speakers can be expensive, providing a lot of sound in a localized area, which does not always optimize the room sound. The best way to distribute the sound is by adding more speakers. Additionally, by adding more speakers, you can use lower power speakers which will minimize the cost of your extension speaker installation.

Using these diagrams as a guide, you will readily see how many different schemes can be achieved. The key things to keep in mind are:

- The load on each channel must be less than 250 watts.
- The maximum you can connect via the Output Transformers (any connections not across E1 and E7) is 125 Watts per channel.
- Pay attention to speaker polarization. Ensure speaker terminals are connected properly.
- Remember to include the jukebox speaker system in your configuration and calculations if you expect to use the jukebox speakers.

### Power Calculations

If you are inclined to perform your own power calculations, the formula to use is:

$$P = E^2 / R$$

P is power in watts

E is the voltage indicated at the transformer tap

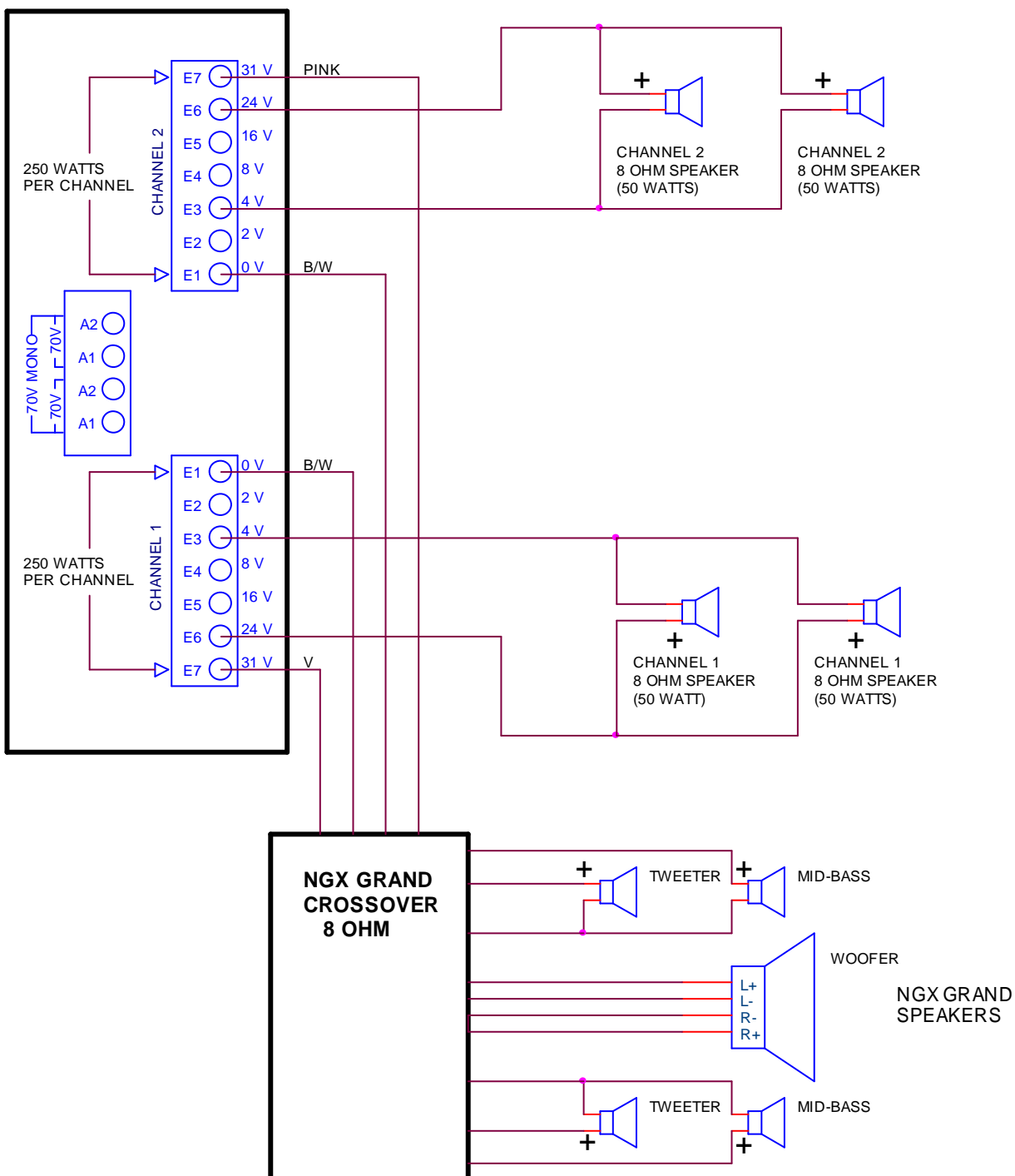
R is the equivalent impedance of the speaker(s) across the tap

Example 1: One 8-ohm speaker across taps E2 (2 volts) to E5 (16 volts) would be:

$$P = (16 - 2)^2 / 8 = 24.5 \text{ watts}$$

Example 2: Two 4-ohm speakers in series across taps E1 (0 volts) to E6 (24 volts) would be:

$$P = (24 - 0)^2 / (4 + 4) = 72 \text{ watts (36 watts per speaker)}$$



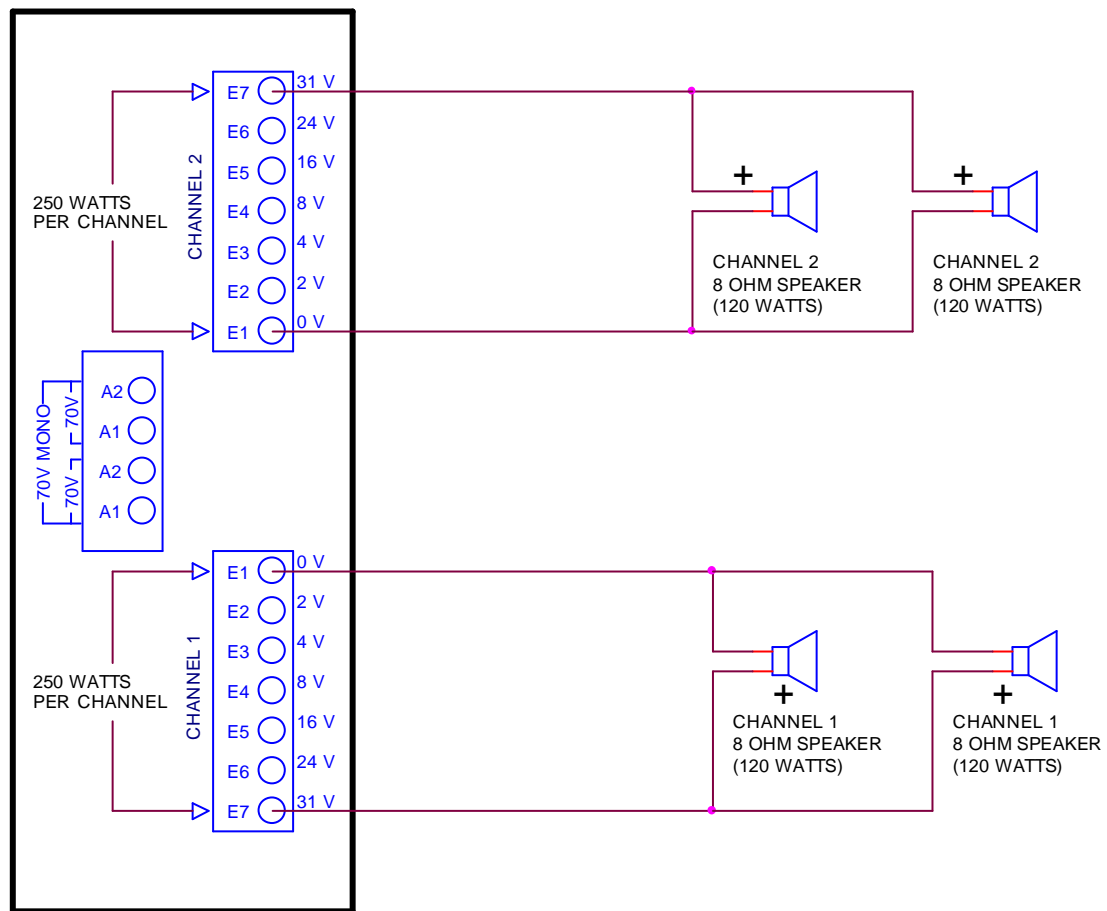
Load as shown is  
220 Watts total per channel.

100 W per channel through the transformer  
120 W per channel across the amplifier

**NOTES:**

1. 70V phasing is reversed inside the output transformer assembly.
2. Wattage indicates actual power. Select speakers with a higher rating.

Figure 3-A

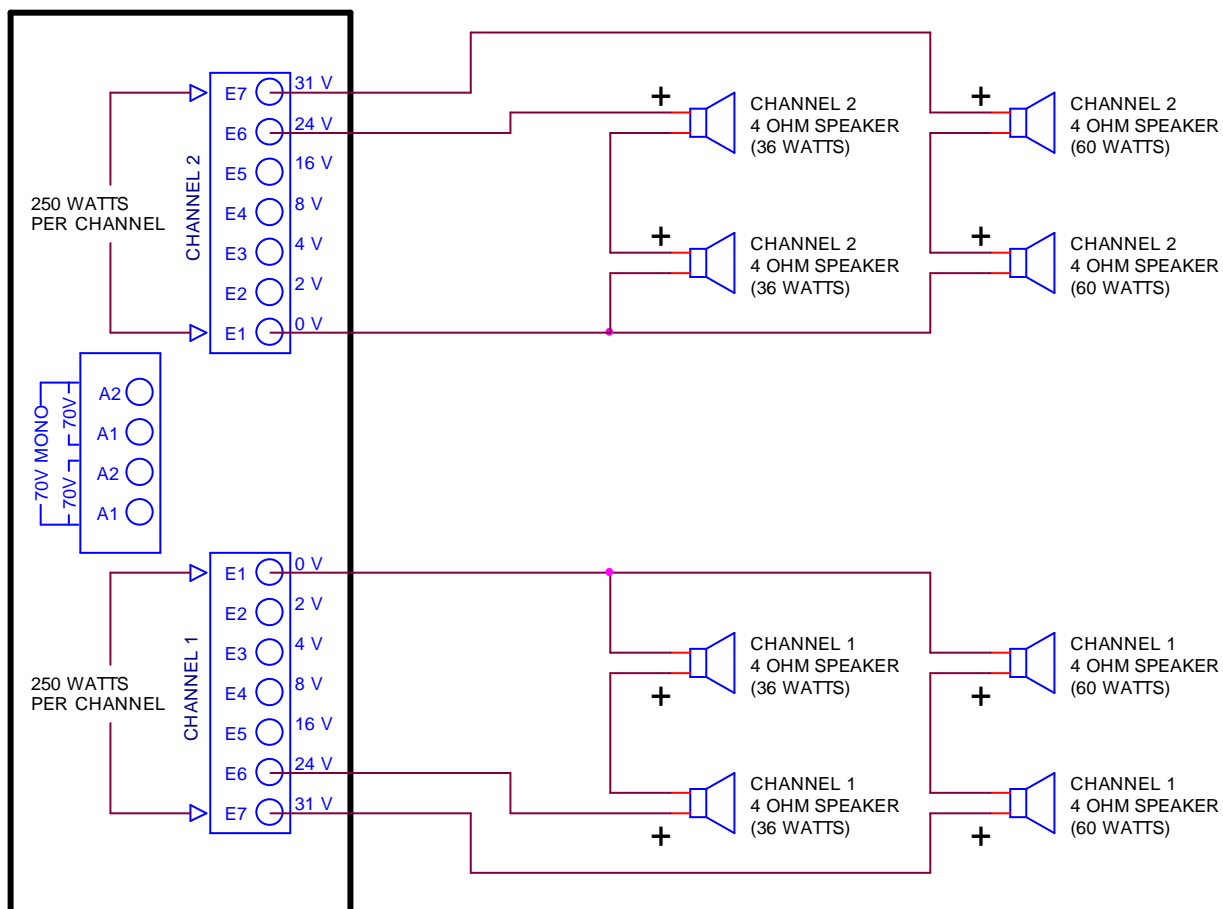


Load as shown is  
240 Watts total per channel across the amplifier.

**NOTES:**

1. 70V phasing is reversed inside the output transformer assembly.
2. Wattage indicates actual power. Select speakers with a higher rating.

Figure 3-B



**Load as shown is  
192 W per channel for extension speakers.**

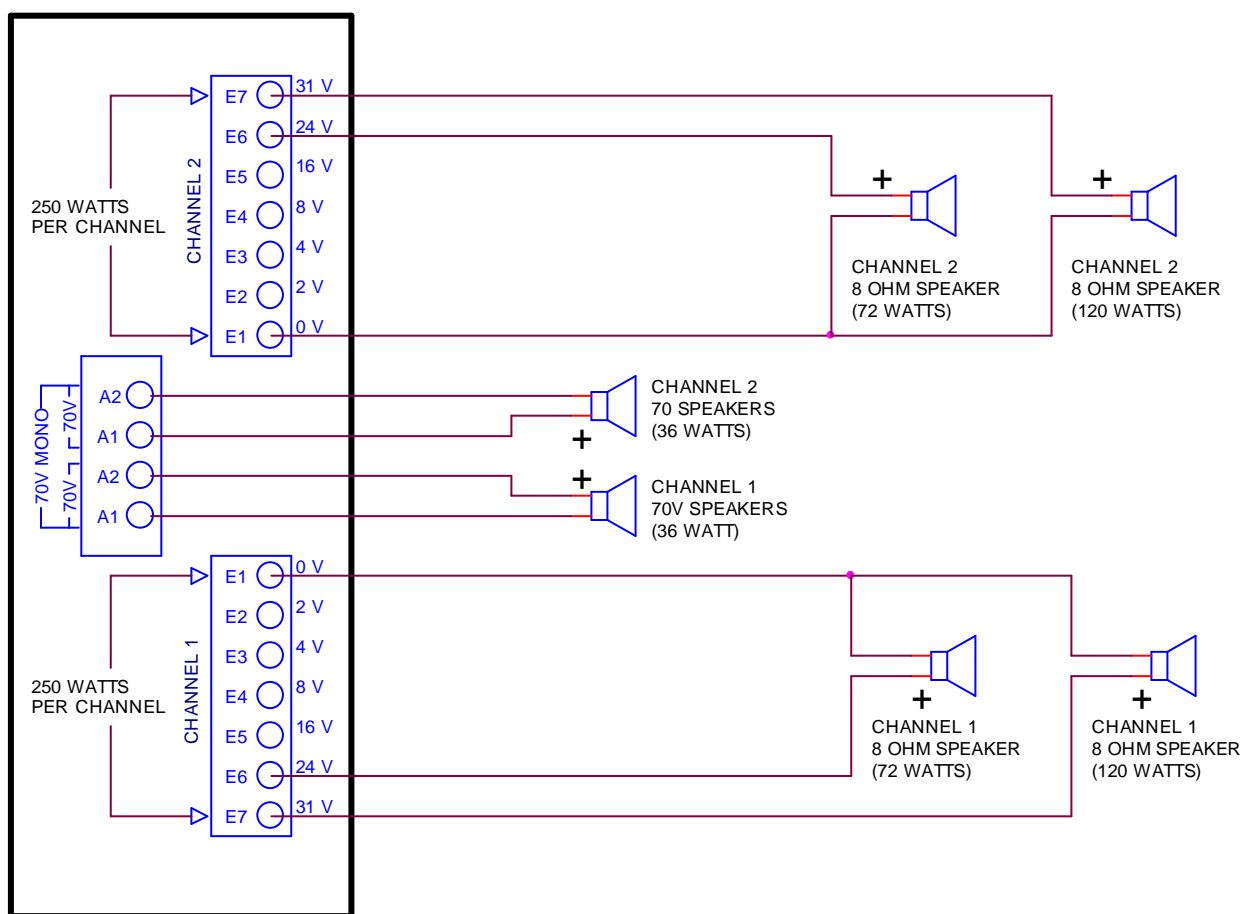
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**72 W per channel through the transformer  
120 W per channel across the amplifier**

**NOTES:**

1. 70V phasing is reversed inside the output transformer assembly.
2. Wattage indicates actual power. Select speakers with a higher rating.

Figure 3-C



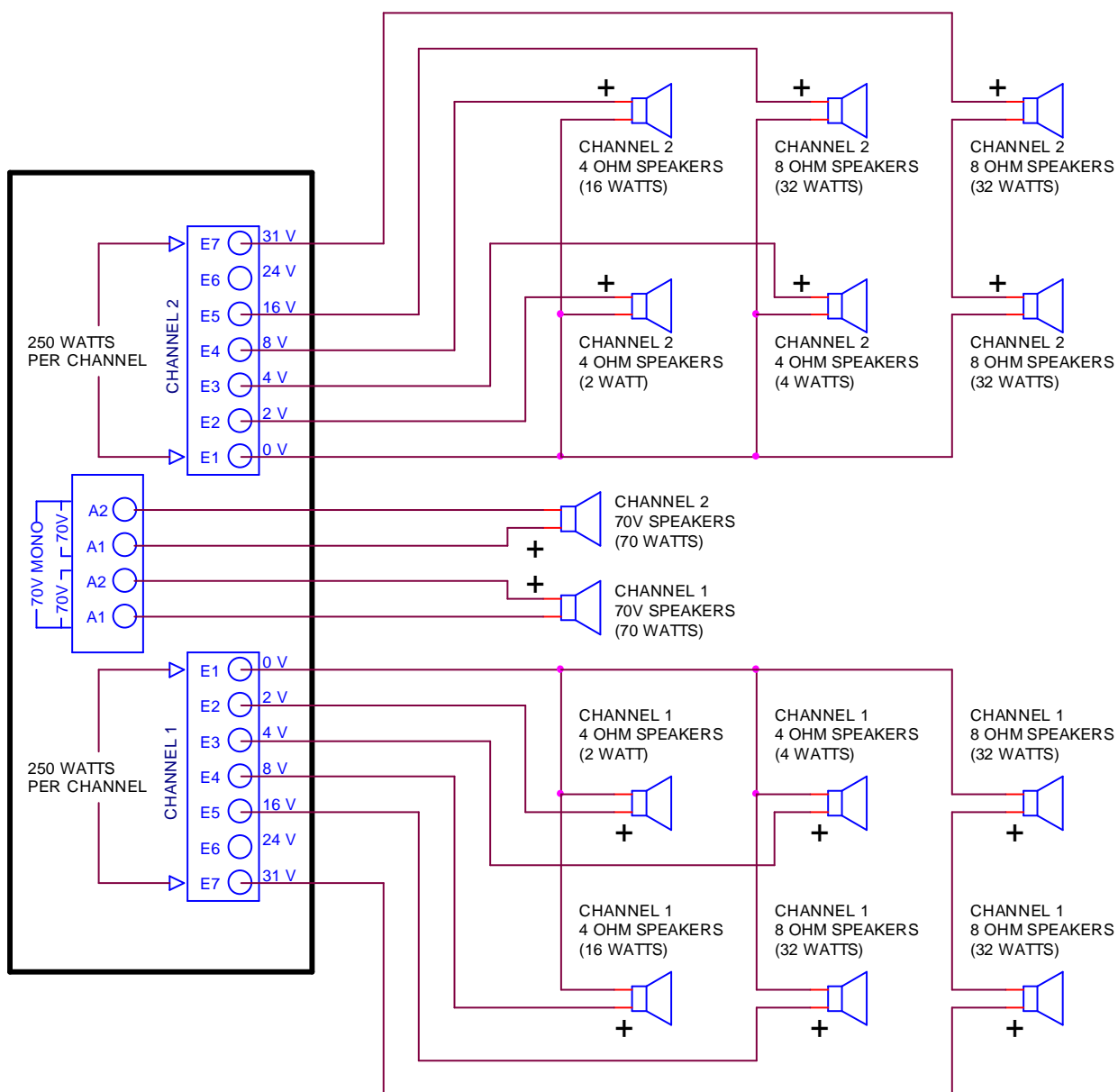
Load as shown is  
 36 W per channel for 70V speakers +  
 192 W per channel for extension speakers.  
 228 Watts total per channel.

108 W per channel through the transformer  
 120 W per channel across the amplifier

**NOTES:**

1. 70V phasing is reversed inside the output transformer assembly.
2. Wattage indicates actual power. Select speakers with a higher rating.

Figure 3-D



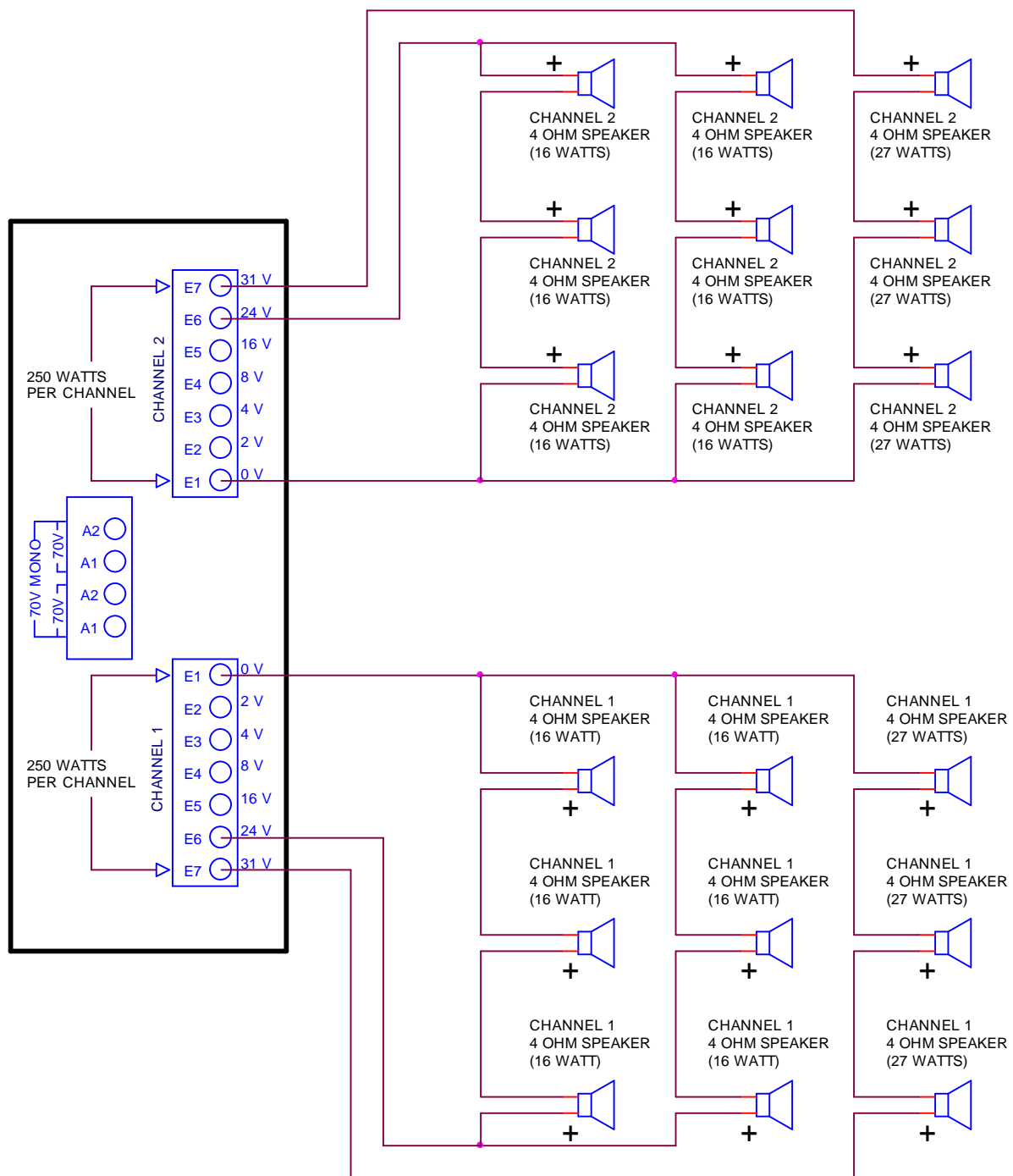
Load as shown is  
 70 W per channel for 70V speakers +  
 118 W per channel for extension speakers.  
 188 Watts total per channel.

124 W per channel through the transformer  
 64 W per channel across the amplifier

#### NOTES:

1. 70V phasing is reversed inside the output transformer assembly.
2. Wattage indicates actual power. Select speakers with a higher rating.

Figure 3-E



Load as shown is  
177 Watts total per channel.

96 W per channel through the transformer  
81 W per channel across the amplifier

**NOTES:**

1. 70V phasing is reversed inside the output transformer assembly.
2. Wattage indicates actual power. Select speakers with a higher rating.

Figure 3-F

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## Section: 4 Parts Catalog

### Cabinet Assembly for NGX Grand Jukebox – Front

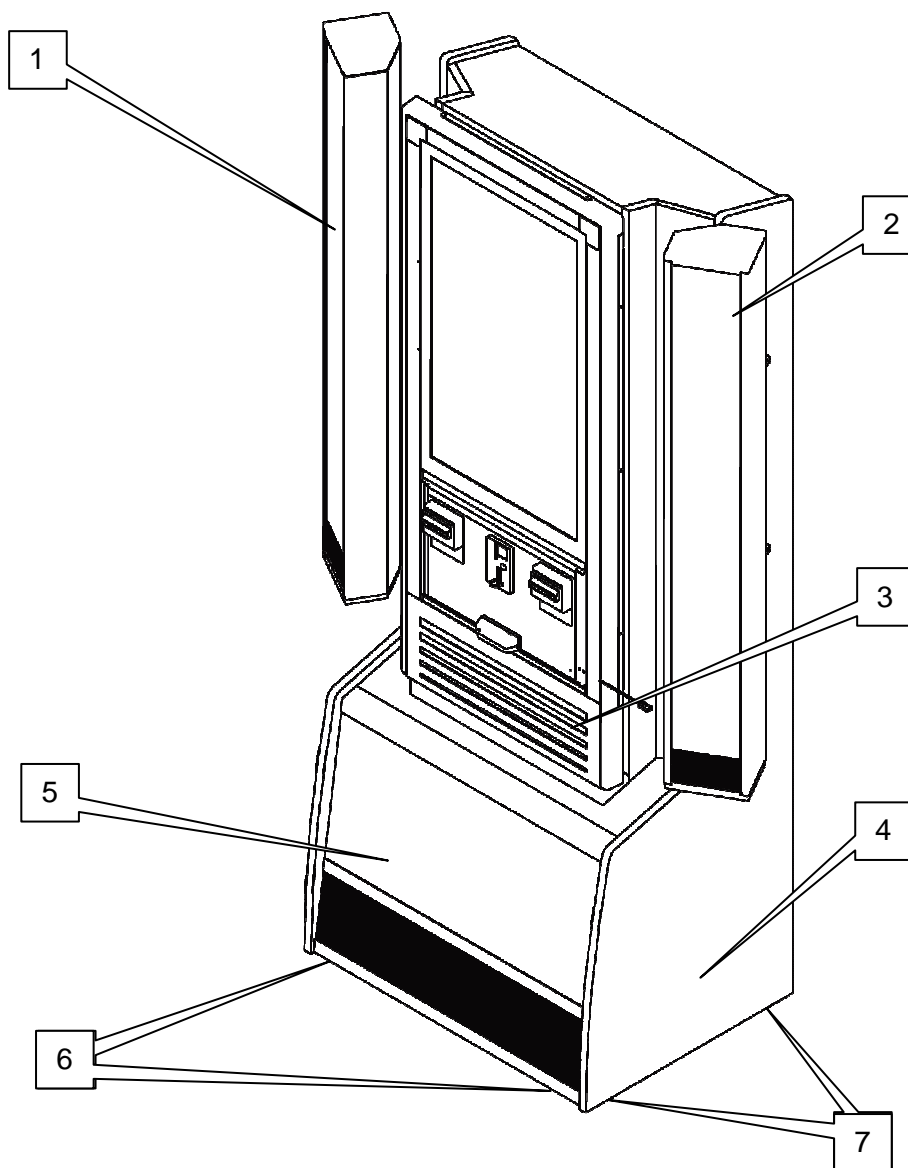


Figure 4-A

No.	Part Number	Description	Qty.
1	61203801	SPEAKER ENCLOSURE-LEFT (MID/TWTR)	1
2	61203802	SPEAKER ENCLOSURE-RIGHT (MID/TWTR)	1
3	61200107	LIGHTING ASSEMBLY	1
4	61201001	CABINET ASSEMBLY	1
5	40992201	PANEL ASSEMBLY-BASS SPEAKER CHAMBER	1
6	41020601	BRACKET - CASTER MOUNTING, FRONT	2
7	30973001	CASTER	4

## Cabinet Assembly for NGX Grand Jukebox – Back

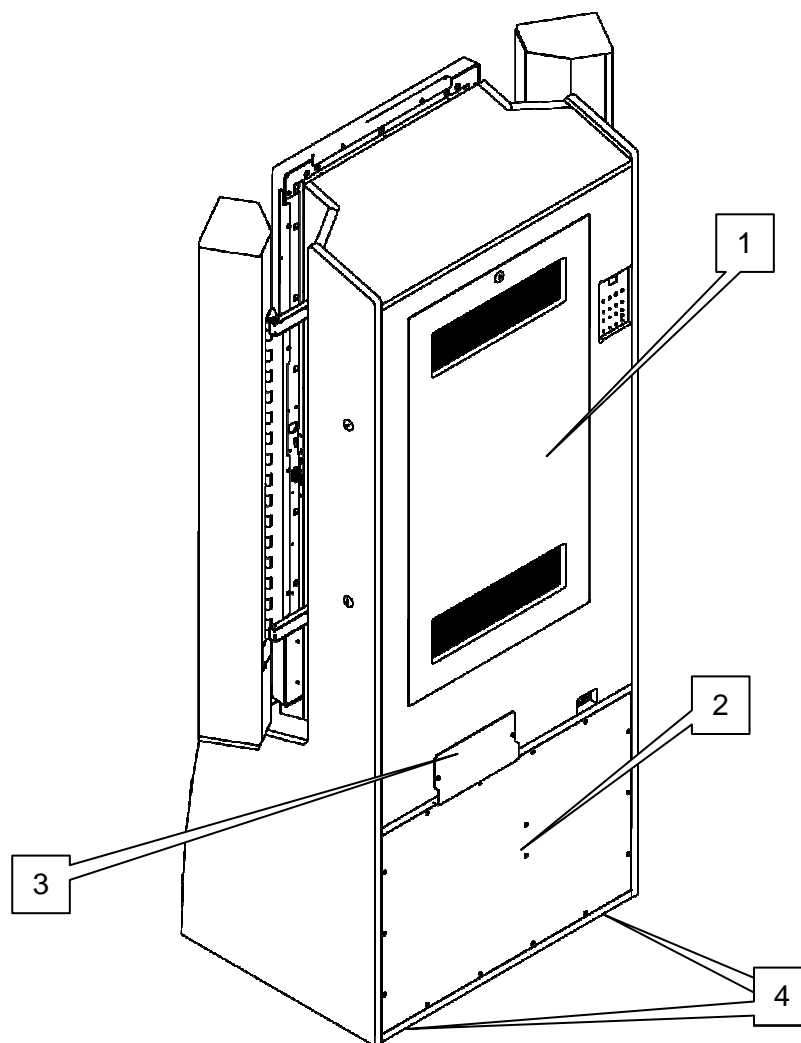


Figure 4-B

No.	Part Number	Description	Qty.
1	61203901	DOOR ASSEMBLY – REAR (CABINET)	1
2	40991901	PANEL – SPEAKER CHAMBER (BACK)	1
3	34107201	COVER – OUTPUT TRANSFORMER	1
4	22192501	BRACKET – CASTER SWIVEL LOCK	2

## Speaker Enclosure Assembly for NGX Grand Jukebox

Right Speaker Enclosure – 61203802

Left Speaker Enclosure – 61203801

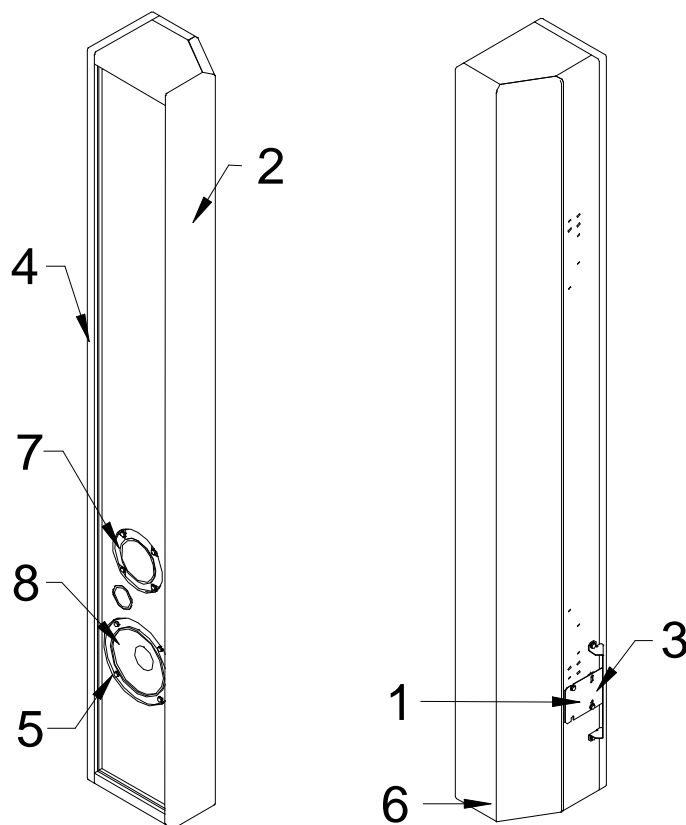


Figure 4-C

No.	Part Number	Description	Qty.
1	30426708	BINDING POST STRIP (3 POS.)	1
2	61203401	ENCLOSURE-LEFT SPEAKER, MID, TWTR	1
3	34108502	COVER-SPEAKER TERMINAL	1
4	40992101	GRILL-SPEAKER (MID/TWTR)	1
5	86662708	SCREW-#6-32 X 1/2 HEX WRH, TYPE 17	14
6	86323616	SCREW-#8 X 1" PHILLIPS FLATHEAD (NOT VISIBLE)	2
7	40830901	SPEAKER-TWEETER (3")	1
8	40830807	SPEAKER-MIDRANGE (5")	1
<b>Not shown above:</b>			
	34107401	PAD-ACOUSTICAL	1
	61203402	ENCLOSURE-RIGHT SPEAKER, MID, TWTR	1
	34054605	HARNESS-SPEAKER ENCLOSURE	1

## Cabinet Assembly for NGX Grand Jukebox – Inside

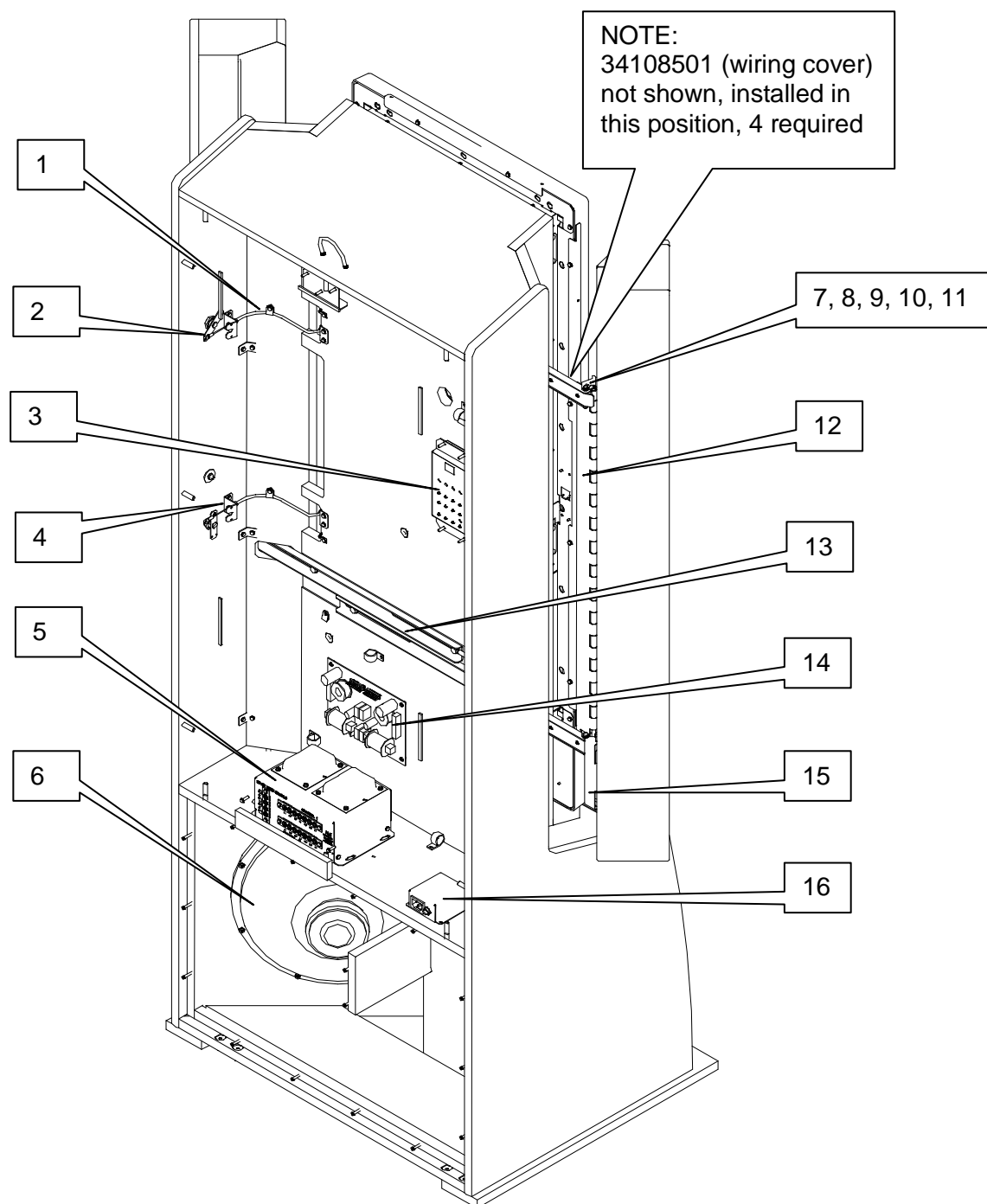


Figure 4-D

## Cabinet Assembly for NGX Grand Jukebox – Inside

Refer to Figure 4-D

No.	Part Number	Description	Qty.
1	34106501	CABLE–LOCK ACTUATOR	2
2	22325601	BRACKET–LOCK ACTUATOR	2
3	34032901	VOLUME CONTROL UNIT	1
4	22326601	BRACKET–LOCK CABLE	4
5	40832124	TRANSFORMER ASSEMBLY–OUTPUT	1
6	61688	SPEAKER, 15" DVC, PEAVEY	1
7	22326103	BRACKET–SPEAKER PIVOT	4
8	34108501	COVER–WIRING	4
9	80493032	#8-32x2 PPH SEMS SCREW	4
10	87843000	#8-32 KEPS HEX MS NUT	4
11	88903000	#8 EXT LOCK WASHER	8
12	34106401	HINGE–SPEAKER MOUNTING	2
13	22326001	CHANNEL–SPEAKER MOUNTING	4
14	61052708	CBA–CROSSOVER	1
15	34108502	COVER–SPEAKER TERMINAL	1
16	34106701	JUNCTION BOX ASSEMBLY	1

Lighting Assembly for NGX Grand Jukebox

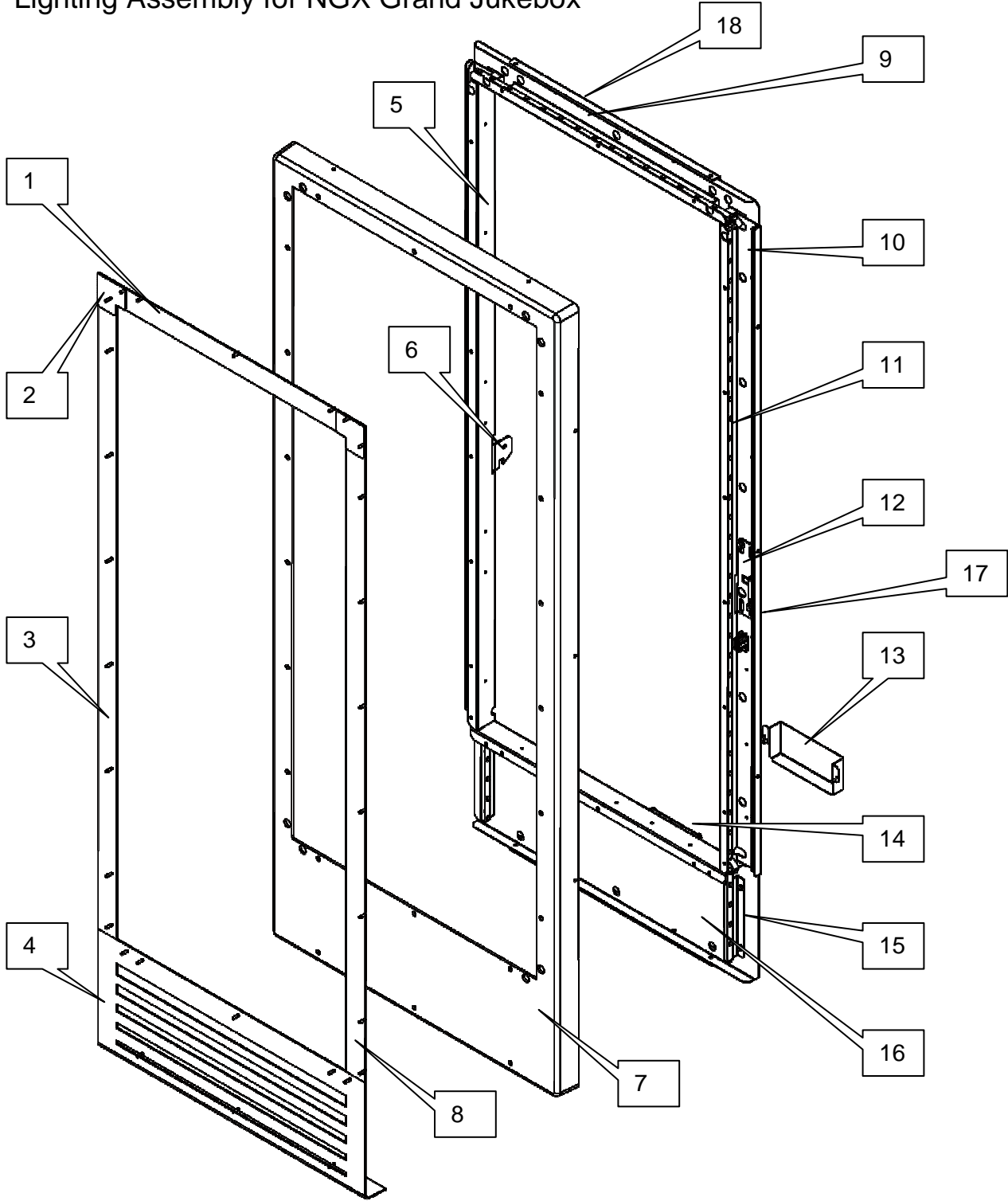


Figure 4-E

## Lighting Assembly for NGX Grand Jukebox

Refer to Figure 4-E

No.	Part Number	Description	Qty.
1	34103805	PLATE-BEZEL (TOP)	1
2	22323503	PLATE-BEZEL (CORNER)	2
3	40990704	PLATE-BEZEL (LH)	1
4	34103804	PLATE-BEZEL (BOTTOM)	1
5	61200215	BRACKET-VERT (LEFT))	1
6	34103904	LATCH-LH	1
7	61200004	DIFFUSER	1
8	40990705	PLATE-BEZEL (RH)	1
9	40990612	BRACKET-HORIZONTAL (TOP)	1
10	61200216	BRACKET-VERT (RIGHT)	1
11	22326301	LED STRIP ASSEMBLY	1
12	34103903	LATCH-RH	1
13	40977102	COVER-LED CONTROL RGB	1
14	41010601	CBA-LED CONTROL	1
15	22327402	BRACKET-MOUNTING (LOWER) (LED STRIP)	2
16	40990613	BRACKET-HORIZONTAL (BOTTOM)	1
17	34104906	BRACKET-DIFFUSER CLAMP	2
18	34100501	BRACKET-DIFFUSER CLAMP SHORT	2

## Miscellaneous Parts for NGX Grand Lighting Assembly

No.	Part Number	Description	Qty.
	22323601	BRACKET-CONNECTOR (LIGHT ASSEMBLY)	1
	22324101	COVER-LIGHT ASSEMBLY CONNECTOR	1
	25156910	WASHER-SHOULDER	2
	22145626	HARNESS ASSEMBLY-INTERCONNECT W/RL W/GND	1
	70134152	SCREW #6-32x3/8 PIN IN TORX BLACK	1
	22145627	HARNESS ASSEMBLY-LED CONTROL W/RL W/GND	1
	22324501	WRENCH-LKEY PIN IN TORX	1

## Lock and Cable Installation

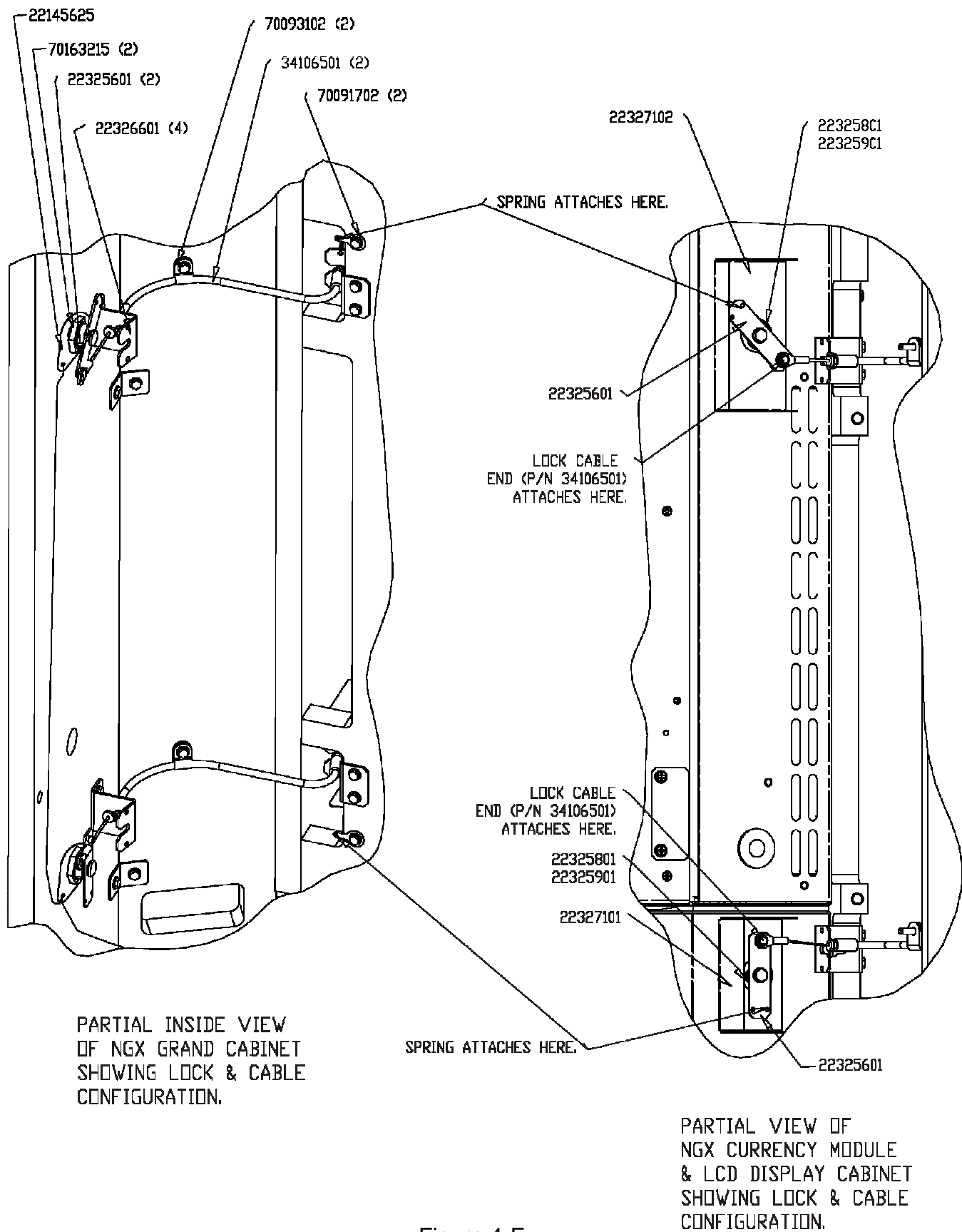
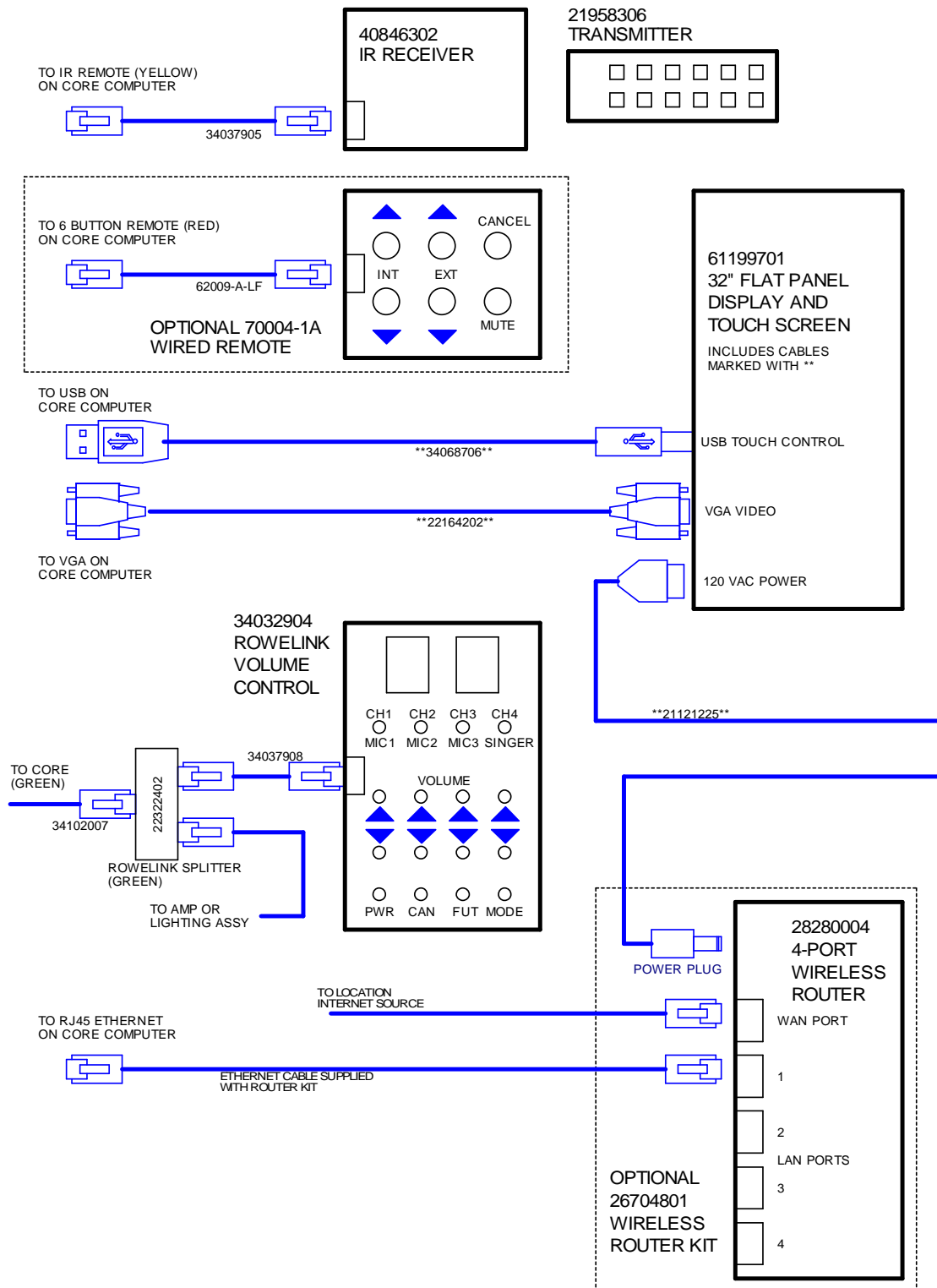


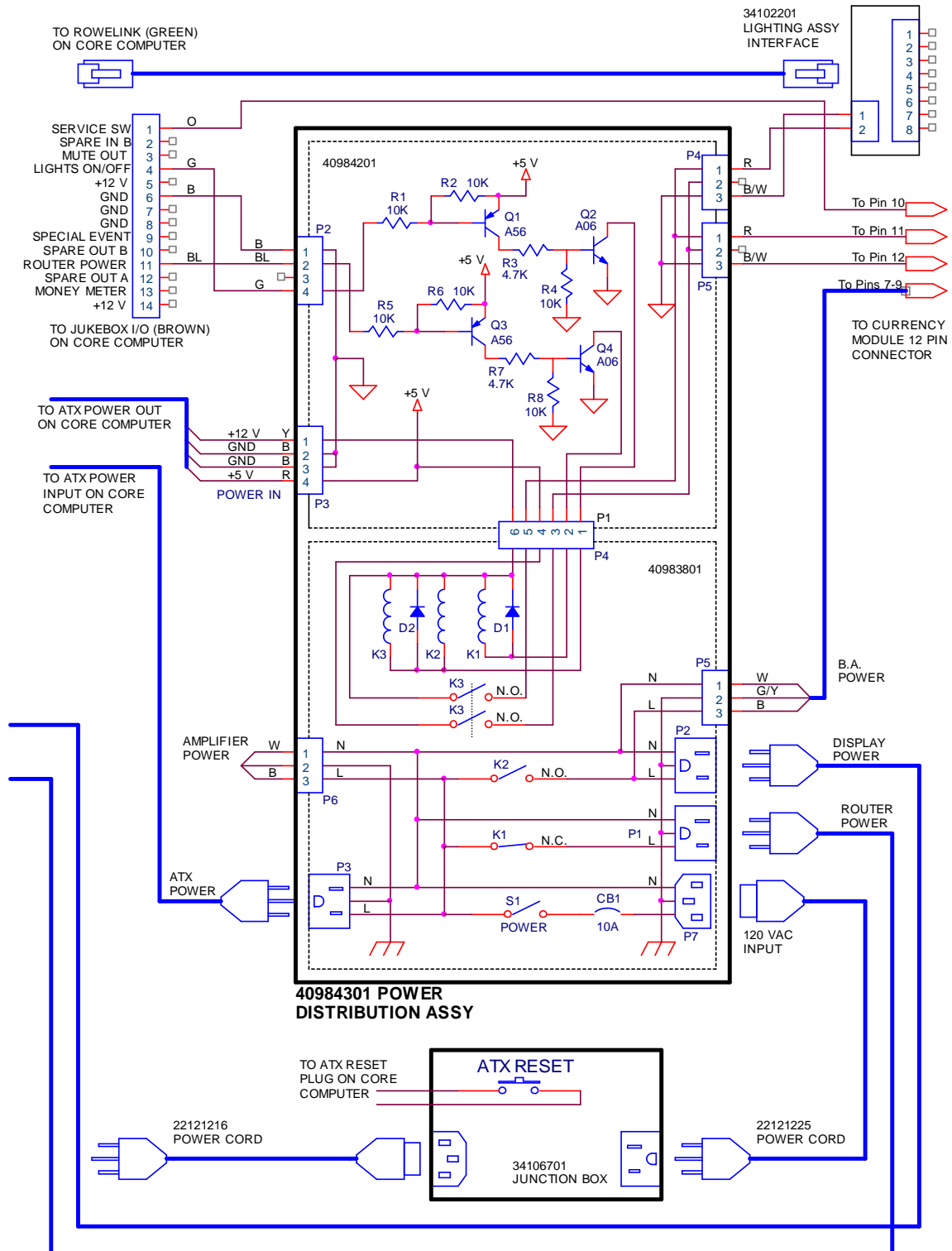
Figure 4-F

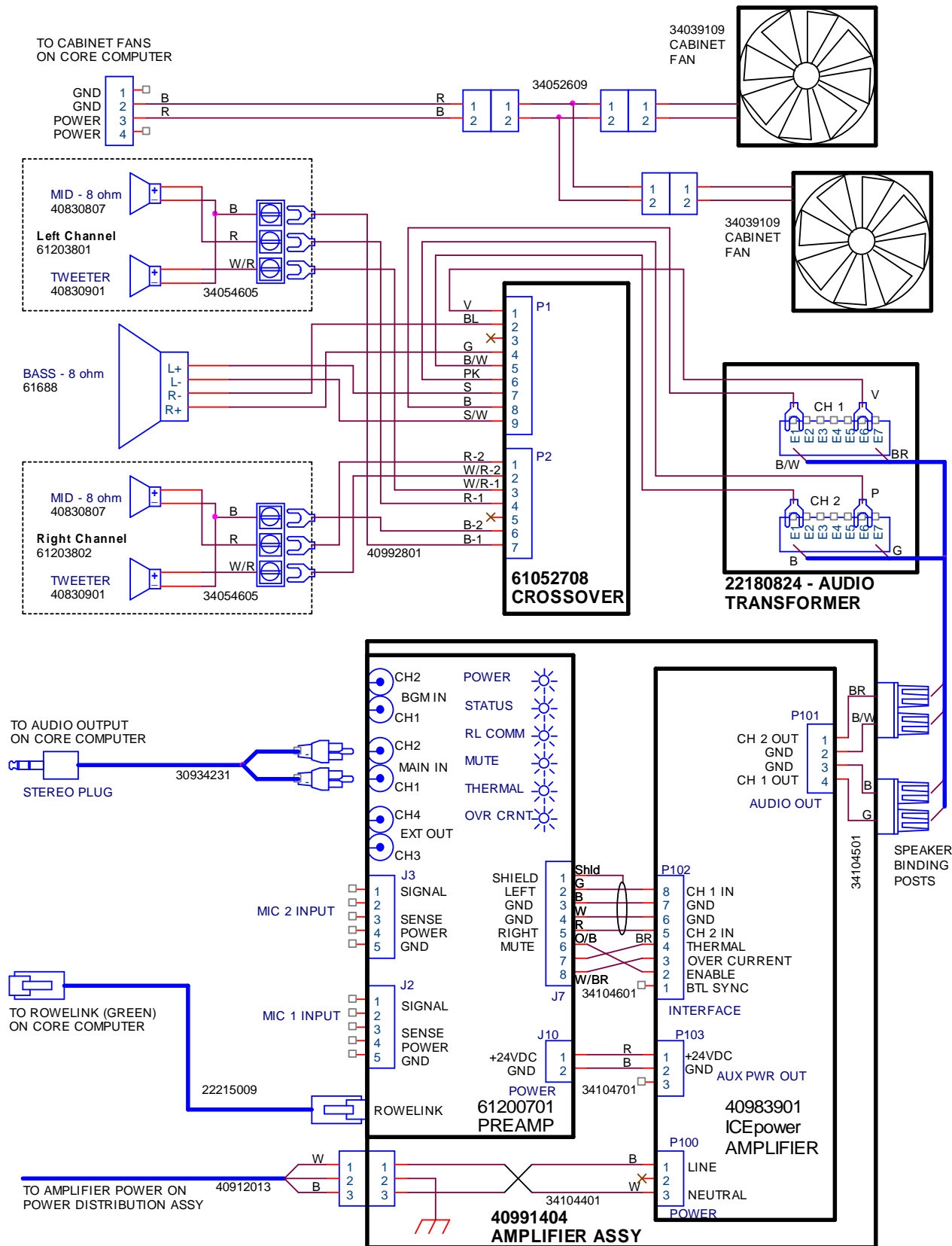


## Section: 5 Block Diagrams

The block diagrams on the following pages are presented to aid in troubleshooting and repair. The wire colors called out on wire harnesses are standard, however, wire colors may be substituted based on availability at the time of manufacture.







SINGLE AMPLIFIER CONFIGURATION

